

PATENT
Docket No. 34003.57
Customer No. 000027683

IV. REMARKS

A. Status of the Application

Claims 9-45 are pending. Claims 9, 11, 14, 16, 19-21, 23, 25-26, 28-29, 32-33, 41-43 and 45 are amended. The amendments to claims 9, 11, 14, 16, 19-21, 23, 25-26, 28-29, 32-33, 41-43 and 45 are not in response to rejections made in the present Office Action, but rather the claim amendments made herein are made to enhance the Applicants' patent portfolio with claims of varying scope, and/or are of a grammatical nature. No new matter has been added by the amendments presented herein. Reconsideration of this application in light of the above amendments and the following remarks is respectfully requested.

B. Objection to the Claims

Claims 9-25 and 28 stand objected to for informalities. Claim 9 has been amended to substitute the word "from" for the word "and" and claim 28 has been amended to delete the word "portion," as suggested by the Office Action. Claims 10-25 depend directly or indirectly from Claim 9. Accordingly, it is respectfully requested that the objection to Claims 9-25 and 28 be withdrawn.

C. Rejections under 35 U.S.C. § 112

Claims 9-45 stand rejected under 35 U.S.C. §112, second paragraph. Insofar as the rejection may be applied against the present claims, this rejection is respectfully traversed.

Claims 9 and 26 have been amended to overcome this rejection. Therefore, it is respectfully requested that the rejection of Claims 9-45 under 35 U.S.C. § 112, second paragraph, be withdrawn.

D. Rejections under 35 U.S.C. § 103

Claims 9-45 stand rejected under 35 U.S.C. § 103(a) over Messer *et al.*, "Microchannel Networks for Nanowire Patterning" (hereafter referred to as "Messer") in view of Kim *et al.*, "Micromolding in Capillaries: Applications in Materials Science (hereafter referred to as "Kim"). Insofar as it may be applied against the present claims, this rejection is respectfully traversed.

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Claim 9 is drawn to a method of selectively isolating a plurality of nanotubes. The method includes (a) placing a channelized mold on a surface, the channelized mold having at least one section of a channel open, wherein the channelized mold is placed such that the surface covers the section to form a covered channel opening, (b) allowing a solution containing nanotubes to flow into the covered channel, (c) drying the solution, and (d) after the solution is dried, separating the mold from the surface such that nanotubes are deposited across the channel. Each of claims 10-25 depend directly or indirectly from claim 9, and therefore include at least the foregoing elements.

Claim 26 is drawn to a method of suspending nanotubes. The method includes (a) placing a suspension of randomly organized nanotubes within a channel, the channel having spaced apart sides; and (b) allowing the suspension to dry so as to encourage certain nanotubes to become suspended across the channel sides. Each of claims 27-45 depend directly or indirectly from claim 26, and therefore include at least the foregoing elements.

Messer discloses a method whereby a poly(dimethylsiloxane) (PDMS) micromold and a silicon/glass substrate are used to form $[\text{Mo}_3\text{Se}_3]_\infty$ wires. Messer, however, discloses the use of the PDMS micromold to pattern nanowires on the substrate. For instance, see page 10232, column 2, second paragraph, line 3 and Figure 1 which shows images on a glass substrate (a) and on a silicon substrate (b-d). Therefore, Messer teaches that a micromold is used to pattern materials on the substrate rather than patterning nanotubes on the micromold.

In contrast to Messer, the method of claim 9 includes "separating said mold from said surface such that nanotubes are deposited across said channel." Also in contrast to Messer, the method of claim 9 is drawn to a method of selectively isolating a plurality of nanotubes.

With respect to claim 26, Messer does not teach, suggest or motivate a method which includes "allowing said suspension to dry so as to encourage certain nanotubes to become suspended across said channel sides." Instead, Messer teaches that nanowires are self-organized only along the corners of the microchannel. The nanowires are confined to the two corners as shown in Figure 3 of Messer. At page 10233, 2nd column, first full paragraph, the last sentence of Messer, it is disclosed that the chains self-organize into bundles through intermolecular forces and align along the channel edge. Therefore, the nanowires are not suspended across the channel sides as set forth in claim 26.

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For the foregoing reasons, it is clear that Messer does not teach, suggest or motivate the methods of claims 9 and 26 for at least the lack of the claim elements cited above.

Kim discloses a method for micromolding in capillaries (MIMIC) used to pattern a surface of a substrate with micrometer- and submicrometer-scale structures. Similar to Messer, Kim discloses a method whereby the micromold is removed from the substrate leaving the patterned material on the substrate. For example:

- At page 5722, column 2, the sentence bridging to page 5723, column 1, line 5, states that an organic or inorganic material in a fluid is crystallized, cured/polymerized, adsorbed/adhered, or reacted with the surface of a substrate, the elastomeric component is removed, and a pattern of the material remains on the substrate.
- Figure 1 provides a schematic showing the procedure used in MIMIC where the patterned material is present on the support after the PDMS mold is removed.
- At page 5723, column 1, lines 3-5 state that the pattern in the master is thus replicated in a structure supported on the surface of the substrate.
- At page 5725, column 2, lines 1-3 state that the polymers used *adhered strongly and preferentially to the substrate* rather than to the PDMS (emphasis added).
- At page 5726, column 2, lines 1-3 state that though these microstructures adhered preferentially to the substrate, some structures were removed from the substrate when the PDMS mold was peeled off.
- At page 5727, column 2, last paragraph, fourth sentence, "Even at this stage, the patterns of microstructures adhered strongly to the support; they could not be removed from the support mechanically using Scotch tape."
- At page 5729, column 1, lines 1-2, "the PDMS mold was peeled away from the support."
- At page 5729, column 2, last paragraph, third sentence, "The crystalline arrays remained on the surface when the PDMS mold was removed."
- At page 5731, column 2, the last sentence under the section entitled "MIMIC" states "the mold was peeled away, and the patterned microstructures remained on the surface of the substrate."
- At page 5731, column 2, prior to the Acknowledgment section, the last sentence states "the PDMS mold was removed; the crystalline arrays of microspheres remained on the surface of the substrate."

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Therefore, Kim teaches that a micromold is used to pattern materials on the substrate rather than patterning nanotubes on the micromold.

In contrast to Kim, the method of claim 9 includes "separating said mold from said surface such that nanotubes are deposited across said channel." Also in contrast to Kim, the method of claim 9 is drawn to a method of selectively isolating a plurality of nanotubes. In this regard, it is noted that Kim is completely silent with respect to nanotubes.

With respect to claim 26, Kim does not teach, suggest or motivate a method which includes "allowing said suspension to dry so as to encourage certain nanotubes to become suspended across said channel sides."

For the foregoing reasons, it is clear that Kim does not teach, suggest or motivate the methods of claims 9 and 26 for at least the lack of the claim elements cited above.

According to MPEP § 2142, to establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references must teach or suggest all the claim limitations. In the present case, neither Messer nor Kim support any of the criteria set forth in MPEP § 2142 with respect to independent claims 9 and 26 or the claims dependent thereon.

As provided in MPEP § 2143.01, obviousness by combining or modifying references can only be established "where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art." In the present case, no such teaching, suggestion or motivation exists.

In particular, Messer and Kim disclose methods in which a micromold is used to pattern materials on a substrate. Contrary to the methods of claims 9 and 26, Messer and Kim are completely devoid of any teaching or suggestion of a method by which nanotubes are patterned on a micromold rather than a substrate, and one of ordinary skill in the art would not be motivated to modify Messer and/or Kim to realize such a method. In addition, there is absolutely no teaching, suggestion or motivation to combine Messer and Kim, and, even if Messer and Kim were combined, the combination would not result in the claimed methods.

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Furthermore, it is impermissible within the framework of 35 U.S.C. §103 to pick and choose from any one reference only so much of it as will support a given position to the exclusion of other parts necessary to the full appreciation of what the reference fairly suggests to one skilled in the art. *Bausch & Lomb, Inc. v Barnes-Hind/Hydrocurve, Inc.*, 796 F.2d 443, 230 U.S.P.Q. 416 (Fed. Cir. 1986).

As noted in MPEP §2142:

[T]he examiner must step backward in time and into the shoes worn by the hypothetical "person of ordinary skill in the art" when the invention was unknown and just before it was made. In view of all factual information, the examiner must then make a determination whether the claimed invention "as a whole" would have been obvious at that time to that person. ...[I]mpermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.

Furthermore, MPEP §2143.01 provides that:

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. (emphasis in original)

Based on the foregoing authorities, it is clear that obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination. In the present case, since Messer and Kim are directed to methods in which a micromold is used to pattern materials on a substrate rather than on the micromold itself, it is clear that the combination of Messer and Kim arises solely from hindsight without any consideration of the references as a whole as applied to claims 9 and 26.

Moreover, since Messer and Kim are directed to methods in which a micromold is used to pattern materials on a substrate rather than on the micromold itself, Messer and Kim clearly teach away from the methods of Claims 9 and 26. It is well recognized that teaching away from a claimed invention is a per se demonstration of lack of prima facie obviousness. Thus, for this reason alone, the burden of factually supporting a prima facie case of obviousness has clearly not been met, and the rejection under 35 U.S.C. §103(a) should be withdrawn.

Therefore, Applicants submit that a prima facie case of obviousness over Messer and Kim has not been established with respect to claims 9 and 26. Applicants further submit that a prima facie case of obviousness over Messer and Kim has not been established with respect to

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claims 10-25 and 27-45, each of which depends directly or indirectly from claim 9 or claim 26, for at least the same reasons as apply to claims 9 and 26.

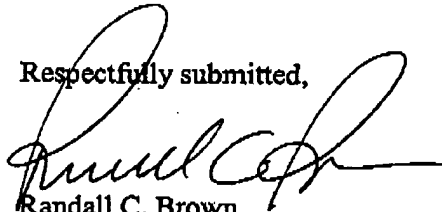
For all of the foregoing reasons, Applicant submits that the rejection of Claims 9 and 26 under 35 U.S.C. § 103(a) should be withdrawn. Since Claims 10-25 and 27-45 each depend directly or indirectly from Claims 9 or 26, the rejection of Claims 10-25 and 27-45 under 35 U.S.C. § 103(a) should be withdrawn for at least the same reasons as applied to Claims 9 and 26. In view of the foregoing, Applicant submits that Claims 9-45 are in condition for allowance.

E. Conclusion

Claims 9-45 are pending in the present application. In view of the foregoing amendments and remarks, allowance of all pending claims is respectfully requested.

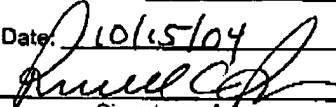
The examiner is invited to call the undersigned at the below-listed telephone number if in the opinion of the examiner such a telephone conference would expedite or aid the prosecution and examination of this application.

Respectfully submitted,



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